

PROJECT NUMBER: 2107
PROJECT TITLE: Filter Research & Development
PROJECT LEADER: C. J. Campbell
PERIOD COVERED: April, 1989

I. IMPROVED FILTRATION - INCREASED EFFICIENCY:

- A. **Objective:** Develop filter systems with a higher efficiency than presently available and evaluate them for subjective advantages.
- B. **Status:** Five cigarette models, one using a Celanese CA web dual filter, three using a Filtrona peripheral flow concentric filters, and one control using a 2.6/42,000 tow have been made for Project 605 subjective and POL testing and are now in CI. The RTD of the CA web cigarettes was examined and they were found to have a coefficient of variation of 9%. This compares to a COV of 7.5% on Lark Milds, for example. Variability of tar delivery will be examined when the data is available.

Six models of non-vented 6mg cigarettes using Project 605 filler are now being made in Semiworks. The filters are duals which include versions of CA Web, Concentric with CA Web core, and Filtrona UHF. Analytical and subjective evaluations are planned.

Three models of Merit Ultra Lights using 1.6 dpf tow and a control using 2.6 dpf tow have been made and given to Flavor Development for subjective evaluation to determine the effect of reducing RTD and ventilation while maintaining tar delivery.

II. IMPROVED FILTRATION - MENTHOL STABILITY:

- A. **Objective:** Investigate methods of improving the stability of menthol delivery in smoke of aged cigarettes.
- B. **Status:** Eleven cigarette models, some with heat treated filters, continue in accelerated ageing conditions with periodic evaluation for stability of menthol delivery.

III. IMPROVED FILTRATION - NOVEL FILTER SYSTEMS:

- A. **Objective:** Develop and evaluate new and unique cigarette filters which may offer a distinct product advantage.
- B. **Status:** CONCENTRIC FILTERS: PM Europe is proceeding with plans for market testing a cigarette with a concentric filter in Europe. They have ordered three million filter rods from American Filtrona to begin production.

CARBON FILTER ROD: A comprehensive project status report is being prepared.

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CA PLUGWRAP: Marlboro Lights and Lark Milds KS models were fabricated using a Dexter plugwrap containing a layer of cellulose acetate fibers embedded within the paper structure. This is intended to adhere to the filter tow with triacetin so anchor lines can be eliminated and ventilation variability reduced. Sufficient adhesion was not obtained on the Lark due to the short filter segment involved. The Marlboro Lights model is now being examined. Further work is planned to attempt to increase the adhesion.

IV. IMPROVED FILTRATION - SELECTIVE FILTRATION:

- A. **Objective:** Explore the use of specific additives in filters for selective filtration or subjective modification of smoke.
- B. **Status:** FML: A report summarizing the initial work done with additives and their ability to improve the subjective character of the smoke compared to untreated FML filters has been issued. Additional work with surface additives is continuing to attempt to achieve parity with a CA filter.

ART: Plans are being made to fabricate fluted recessed filters to test their ability to enhance subjective impact. Also, carbon treated with acidic or basic additives will be placed into filters to provide selective filtration and modify the subjective response. Prior art of selective filtration has been reviewed by Physical Research and selected methods will be incorporated into filter models for evaluation on removal of gas phase components.

V. FILTER SUPPORT FOR OTHER R&D PROGRAMS:

- A. **Objective:** Provide design assistance and potential new filter systems for other R&D programs.
- B. **Status:** CARBOWAX REPLACEMENT: Models of three types of cigarettes with charcoal filters have been made with triacetin plasticizer and evaluated versus Carbowax controls for gas phase filtration after ageing. Analytical results show that gas phase removal is only slightly diminished over time with the triacetin filters. Subjective evaluations by the Richmond Panel of these models have not indicated a clear preference for any one model.

An ageing study now in progress shows that carbon removes triacetin from CA filters over time. The current analytical technique does not detect this absorbed triacetin.

A test is being planned to evaluate the performance of both Carbowax and triacetin filters which are aged without being attached to cigarette rods in an effort to isolate the effects the tobacco may have on the active carbon. These will be attached to tobacco rods with no dilution just prior to smoking and gas phase reduction will be measured.

LARK SUPER LIGHTS: Models of Lark Super Lights cigarettes which achieve a reduced tar delivery of 7mg from the current 9mg without increasing ventilation or RTD were successfully made using 1.6/41,000 tow. Sample 27mm plug-space-plug filters submitted by Filtrona England are currently being evaluated.

LARK VENTILATION VARIABILITY STUDY: Analytical results of seven test models of Lark Milds cigarettes made in the Manufacturing Center with various combining paper types are promising. Three of the models, one with a Filtrona MPF filter, and two with a patterned hot melt on the combining wrap, show lower ventilation variability than is normally seen on Lark. All three of these also machined well.

Additional models using inherently porous combining papers such as 70-S1 were attempted to be made April 22, however the run was unsuccessful because the adhesive system was not able to adhere the components to the combining paper. An alternate glue system is being developed and the test will be repeated.

Semiworks has completed setting up a Hauni Laser on one of their tippers for on line perforation. Cigarette models are scheduled to be produced the week of May 8. These will then be evaluated for ventilation variability. An initial cost estimate for converting Lark to a Hauni on line Laser system has been prepared by Industrial Engineering at the MC and has been issued.

Information on a variety of plug-space-plug filters from competitive brands has been gathered to access the ventilation variability of other types of construction. The analysis supports our current development ideas.

Dexter is submitting sample bobbins of their "tea bag" material which is a porous paper with polypropylene fibers on one side. These fibers are heat sealable, but retain the inherent porosity of the paper. This material will be tested in place of the current mechanically perforated combining paper.